CLAIMS

What is claimed is:

1. A communication device which communicates data in an asynchronous transfer mode (ATM) format comprising:

at least one buffer (130, 158) configured to receive data from a sending device (52, 104); and

a modulator/demodulator unit (144, 150) coupled to the buffer (130, 158) and configured to encapsulate at least one ATM cell (176a) into an ATM frame (170), the ATM cell (176a) having the received data, so that the ATM frame (170) is communicated onto a subscriber line (18),

such that the communicated ATM frame (170) has a variable transmission duration, the variable transmission duration corresponding to a number of ATM cells (176a through 176n) encapsulated into the ATM frame (170).

2. The communication device of claim 1, wherein the ATM frame (170) comprises a preamble (172), the preamble (172) having at least an address identifying a remote data terminal unit (DTU-R, 100), such that a selected one of a plurality of DTU-Rs (100) receives the communicated ATM frame (170) according to the address in the preamble (172).

3. The communication device of claim 1, wherein the modulator/demodulator unit (144, 150) is further configured to parse the received data into a plurality of data portions, and further configured to load information corresponding to each one of the plurality of data portions into a corresponding one of the ATM cells (176a through 176n).

4. The communication device of claim 1, further comprising a unique address identifying the communication device from a plurality of other communication devices coupled to the same subscriber line (18), such that when a poll ATM frame (180, 186, 190 and 194) having an address that corresponds to the unique address identifying the communication device is received, the communication device communicates a response frame (182, 188, 192 and 196) having a duration of

transmission that corresponds to the amount of data residing in the at least one buffer (130, 158).

5. A method for communicating data in an asynchronous transfer mode (ATM) format, the method comprising the steps of:

receiving data;

loading information corresponding to the received data into at least one ATM cell (176a) having a predefined size;

encapsulating the at least one ATM cell (176a) into an ATM frame (170); and

communicating the ATM frame (170) onto a subscriber line (18),

such that the communicated ATM frame (170) has a variable transmission duration, the variable transmission duration corresponding to a number of ATM cells (176a through 176n) encapsulated into the ATM frame (170).

6. The method of claim 5, wherein the step of encapsulating the at least one ATM cell (176a) into the ATM frame (170) further comprises the steps of:

encapsulating a preamble (172) into the ATM frame (170), the preamble (172) having at least an address identifying a remote data terminal unit (DTU-R, 100); and

communicating the ATM frame (170) to a selected one of a plurality of DTU-Rs (100) according to the address in the preamble (172).

7. The method of claim 5, wherein the step of loading information corresponding to the received data into the at least one ATM cell (176a) further comprises the steps of:

parsing the received data into a plurality of data portions having information corresponding to a respective portion of the received data; and

loading each one of the plurality of data portions into a corresponding one of the ATM cells (176a through 176n).

8. A method for adjusting a duration that an asynchronous transfer mode (ATM) frame (170) is transmitted over a subscriber line (18), the method comprising the steps of:

receiving data;

parsing the received data into a plurality of data portions having information corresponding to a respective portion of the received data, each one of the data portions configured to be loaded into one of a plurality of ATM cells (176a through 176n) having a predefined size;

loading each one of the data portions into a corresponding one of the plurality of ATM cells (176a through 176n) until all the data portions have been loaded;

generating the ATM frame (170) by encapsulating the plurality of ATM cells (176a through 176n) into the ATM frame (170); and

communicating the ATM frame (170) onto the subscriber line (18),

such that the communicated ATM frame (170) has a variable transmission duration, the variable transmission duration corresponding to a number of the plurality of ATM cells (176a through 176n) encapsulated into the ATM frame (170).

9. The method of claim 8, further comprising the steps of:

defining a maximum number of ATM cells (176n) that can be encapsulated into the ATM frame (170);

loading each one of the ATM cells (176a through 176n) with one of the plurality of data portions until the last ATM cell (176n) is loaded; and

encapsulating the maximum number of loaded ATM cells (176a through 176n) into the ATM frame (170), such that remaining data is communicated at a later time in a subsequently generated ATM frame (170) such that a duration of transmission of the communicated ATM frame (170) corresponds to the maximum number of ATM cells (176a through 176n).

10. The method of claim 8, further comprising the steps of:

defining a maximum number of ATM cells (176n) that can be encapsulated into the ATM frame (170);

loading each one of the ATM cells (176a through 176n) with one of the plurality of data portions until all of the data portions are loaded; and

encapsulating only the loaded ATM cells (176a through 176n) into the ATM frame (170) such that a duration of transmission of the communicated ATM frame corresponds to the number of loaded ATM cells (176a through 176n).

11. The method of claim 8, further comprising the steps of:

communicating a poll ATM frame (180, 186, 190 and 194) having an address to a plurality of remote data terminal units (DTU-Rs, 100), each one of the DTU-Rs (100) identified by a unique address; and

receiving a response ATM frame (182, 188, 192 and 196) only from the DTU-R (100) having the unique address that corresponds to the address in the poll ATM frame (180, 186, 190 and 194).

12. The method of claim 8, further comprising the steps of:

receiving a poll ATM frame (180, 186, 190 and 194) having an address from a central office data terminal unit (DTU-C, 102) by one of a plurality of remote data terminal units (DTU-Rs, 100), each one of the DTU-Rs (100) identified by a unique address; and

communicating a response ATM frame (182, 188, 192 and 196) only by the DTU-R (100) having the unique address that corresponds to the address in the poll ATM frame (180, 186, 190 and 194).